Wednesday, March 6, 1991
2:00PM–3:30PM, Room 360, West Concourse
Diagnosis of Coronary Disease by Pharmacologic Stress Echo

2:00

COMPARISON OF ADENOSINE, DIPYRIDAMOLE, AND DOBUTAMINE STRESS ECHOCARDIOGRAPHY FOR THE DETECTION OF CORONARY ARTERY DISEASE.

Timothy Martin, MD, John Seaworth, MD, FACC, Joseph Johns, MD, FACC, Lawrence Pupa, MD, FACC, William Condos, MD, FACC. Brooke Army Medical Center, Fort Sam Houston, TX.

The ideal drug for pharmacologic stress echocardiography is uncertain. We compared adenosine (AD), dipyridamole (DI), and dobutamine (DO) stress echo in 32 pts. Each received intravenous AD, DI, and DO in a single-blind, random order. Two dimensional echocardiography was positive if abnormal wall motion was present at rest or during infusion. Coronary angiography was performed within 6 weeks of testing. Eight pts had single vessel disease (stenosis > 50%) and 16 pts had multivessel disease. Thirteen were taking beta blockers and 22 calcium channel blockers.

	Sensitivity	Specificity	Accuracy
AD (0.84 mg/kg)	75%	62%	72%
DI (0.84 mg/kg)	78%	88%	81%
DO (0.38 mg/kg)	83%	50%	72%

There was no difference in the ability of the drugs to detect coronary disease ($p>0.05$). New or increased wall motion abnormalities occurred in 19 pts with DO, 13 with DI, and 9 with AD ($p<0.05$). The double product was significantly higher during DO infusion (16K vs 10K for AD and DI, $p<0.05$), but diagnostic ST changes were more common with DI (5) and AD (4) than DO (3). The infusion was stopped prematurely for severe symptoms or EKG changes in a few patients (DO-3, DI-3, AD-2), but no significant complications occurred with any drug. More patients preferred DO (16) than DI (11) or AD (5). In conclusion, although there were clinical differences between the drugs, each provided a safe, effective means for detecting coronary disease.

2:15

COMPARISON OF DOBUTAMINE STRESS ECHOCARDIOGRAPHY WITH DOBUTAMINE STRESS SPECT THALLIUM IMAGING FOR DETECTION OF CORONARY ARTERY DISEASE

Douglas S. Segar, Kenneth E. Berkovitz, Stephen G. Sawada, Thomas Ryan, Steven C. Smart, Roxanne Williams, Robert W. Burt, Harvey Feigenbaum. Indiana Univ., Roudebush VA Hospital, Indianapolis, IN

We have previously demonstrated that Dobutamine Stress Echocardiography (DSE) is both sensitive and specific for the detection of coronary artery disease (CAD). The purpose of the current study was to compare DSE to Dobutamine SPECT Thallium (DST) for the detection of CAD. Patients (n=25) underwent DSE with incremental infusion of dobutamine (Dob) to a peak dose of 40 mcg/kg/ min in 2 min stages or until an endpoint was reached. 2-D echo images were obtained during rest, low and peak dose stages. During peak Dob infusion 3-5 mCi of Thallium-201 was injected and heart rate maintained for a minimum of 1 min. Pts then underwent immediate and 4 hr post SPECT imaging. DSE and DST images were interpreted by single blinded observers. Cardiac catheterization was performed in 14 pts. Significant CAD was defined as a lesion ≥50%. **Results:** DSE and DST were interpretable in all patients. There was agreement between DSE and DST in the determination of a normal (N) vs. abnormal (Ab) study in 22/25 (88%, 17 Ab, 5 N). DSE was Ab in 3 pts with a N DST (1 pt with an occluded right coronary artery, 1 pt with a non-ischemic cardiomyopathy that had improvement in wall motion with Dob, 1 pt not cathed). Of the 17 Ab studies there was agreement in the region of inducible ischemia in 12/17 pts. DSE revealed an additional abnormality in 4/5 pts in which there was not complete agreement. Significant CAD was found in 9/14 pts who had cardiac cath. DSE identified 9/9 pts correctly, DST identified 8/9 pts correctly (1 pt with an occluded right coronary artery read as normal). Of the 4 pts with single vessel disease (SVD) DSE identified 4/4, DST 3/4. Of the 5 pts with 3 vessel disease DSE identified 4/5 correctly, DST 0/5 (2 pts read as SVD, 3 pts read as 2 vessel disease). **Conclusion:** There is excellent agreement between DSE and DST for assessing the presence or absence of CAD. DSE appears more accurate for the detection of multivessel disease.

2:30

DOBUTAMINE ECHOCARDIOGRAPHY IDENTIFIES RESIDUAL STENOSIS AND MULTIVESSEL DISEASE AFTER THROMBOLYSIS IN MYOCARDIAL INFARCTION

Steven C. Smart, Stephen G. Sawada, Thomas Ryan, Douglas S. Segar, Patrick D.V. Bourdillon, Harvey Feigenbaum, Krannert Institute of Cardiology, Indiana University and VA Medical Center, Indianapolis, IN

We have previously shown that low-dose (4 mcg/kg/min) dobutamine stress echocardiography (DSE) identifies pts with contractile reserve (viability) in the infarct zone. In this study, 52 pts who received thrombolysis for myocardial infarction (MI) had cardiac catheterization and low and high-dose (23±12 mcg/kg/min) DSE 5±2 days after MI. Improvement in infarct zone wall motion (WM) occurred in 21 pts (40%) at low-dose, indicating viability. High-dose dobutamine infusion increased the heart rate to 96±18 per min. Thirteen of 20 pts (65%) with >70% residual stenosis of the infarct artery demonstrated worsening WM at high-dose. Only 1 pt with evidence of viable myocardium had <70% residual stenosis and no worsening of WM at high-dose. Accuracy of worsening WM to predict residual stenosis was 67% (14 of 21 pts). In the 31 pts who had no evidence of infarct zone viability at low-dose, the accuracy of worsening WM at high-dose for detection of residual stenosis was only 48%. Twenty-six pts had multivessel disease (MVD, >70% stenosis in ≥2 arteries). The presence of rest or induced WM abnormalities in the noninfarct zone had positive and negative predictive values of 76% and 74%, respectively, for MVD. In conclusion: 1) among pts with evidence of viable myocardium, worsening of WM in the infarct zone during high-dose DSE was indicative of residual stenosis of the infarct artery; 2) DSE probably cannot predict residual stenosis of the infarct artery in pts without evidence of viability, and 3) a rest or induced WM abnormality in the noninfarct zone is predictive of MVD.

2:45

ADENOSINE ECHOCARDIOGRAPHY FOR THE DETECTION OF CORONARY ARTERY DISEASE: CORRELATION WITH SPECT-THALLIUM-201 SCINTIGRAPHY

Vance E. Wilson MD, Markus Schwaiger MD, Kevin C. Allman MD, Neil A. Petry MS, William F. Armstrong MD, FACC. University of Michigan, Ann Arbor, MI

The range and magnitude of wall motion abnormalities at the time of vasodilation with adenosine have not been fully described. We performed 2D-echocardiograms at the time of adenosine infusion in 44 patients undergoing SPECT-Tl-201 scintigraphy simultaneously. Twenty-five patients had suspected coronary artery disease(CAD) only; the remainder had proven CAD by prior cath(12), PTCA(9), CABG(7) or MI(6). Regional wall motion was assessed by echocardiography using 16 left ventricular segments. On the baseline studies, fixed defects were considered present if at least 1 non-basilar segment was akinetic. Ischemia was considered present if more than 2 contiguous segments developed hypokinesis or if 1 non-basilar segment developed akinesis during adenosine infusion. SPECT data were similarly categorized. Results:

	SPECT			
ECHO	Normal	Fixed	Mixed	Ischemia
Normal	23	2	0	2
Fixed	0	5	1	0
Mixed	0	2	4	1
Ischemia	1	0	1	2

Echo and SPECT studies were fully concordant in 34 out of 44 patients (77%). The sensitivity of Echo for the detection of any perfusion abnormality by SPECT was 80% (16 out of 20); specificity 96%. The sensitivity of Echo for the detection of ischemia by SPECT was 73% (8 out of 11); specificity 91%.

Conclusion: Adenosine echocardiography may be useful for the detection of coronary artery disease based on a high degree of correlation with SPECT-Tl-201 scintigraphy.